Cement MILL SECTION of

Concrete

Vol. 27 AUGUST, 1925 No. 2

Trinity Company Completes Fort Worth Plant

Cement manufacture, reduced to the simplest possible routine, fewest operations and the ultimate of efficient and economic production, is the achievement believed to be realized, in the recently completed plant of the Trinity Portland Cement Co. at Fort Worth, Texas.

From the raw rock and shale in the quarry to the finished product in the sack aboard car or truck only fourteen distinct operations are required. Each of these operations is so perfectly coordinated, in natural sequence and so efficiently handled by modern equipment, that man-power, motive power, time and cost are reduced to a minimum.

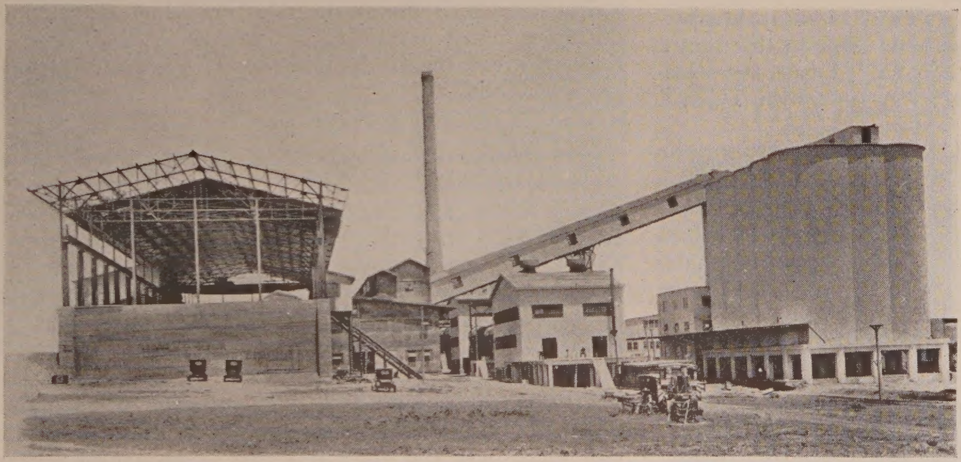
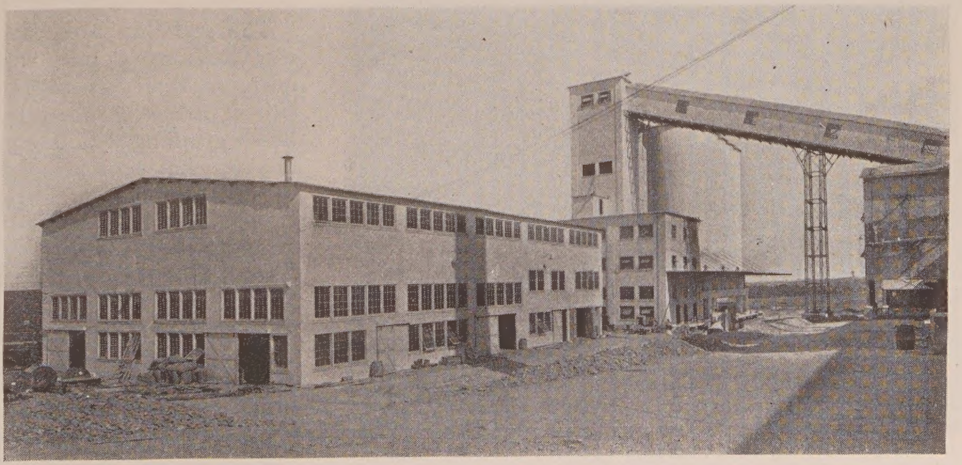


Fig. 1 — General view of new plant of Trinity Portland Cement Co., Fort Worth, Texas

Fig. 2—Close up view showing modern building housing offices, laboratory machine shops and stock room; also the sack handling and repair department building which is attached to the large silo-type concrete storage bins and packing room



The plant is of the wet process type and has an annual capacity of 500,000 barrels. Its completion represents the realization of a dream on the part of W. H. L. McCourtie, president of the Trinity company, who has been an active factor in the cement industry of this country for more than thirty years. Associated with him, in the supervision of the planning and construction, is C. E. Ulrickson, vice-president and general manager of the company.

Pride as well as profit in maximum efficiency long ago inspired in these men an ambition to, one day, build a perfect cement mill.

The capacity of the Trinity company's great plant at Dallas having become inadequate to supply the growing demands of the territory, opportunity came to plan and build a new plant from the ground up that would be a model for the industry.

Far-sighted investigation of available sources of raw material and advantages of location culminated in July, 1923, in the purchase of 600 acres of land about four miles northwest of Fort Worth, Texas. This land is overlaid with first class cement-making material, consisting of limestone and shale. The limestone, having a depth of from 15 to 100 ft., overlays a rich strata of very fine shale.

Construction of the plant was begun in June, 1924, and was finally completed and in full operation in May this year. The combined capacity of this and the company's other plant at Dallas is well over 2,000,000 barrels annually, making the Trinity Portland Cement Co. one of the really big factors in the industry.

The new Fort Worth plant secures its raw material from the quarry located just a few hundred yards from the plant site. Owing to the stratification of rock, practically no blasting at all is required. Due to this fact a comparatively small shovel[1] is adequate; hence, the selection of a No. 32 Marion Caterpillar type with 1¼ yd. bucket.

The material is transported from the quarry to the crusher by the Woodford Electric Haulage system. This is an electrically operated third rail system. A tower man exercises control over all cars. Tower apparatus for this system consists of standard control and automatic mechanism by which the tower operator manipulates the cars from the quarry to the crusher.

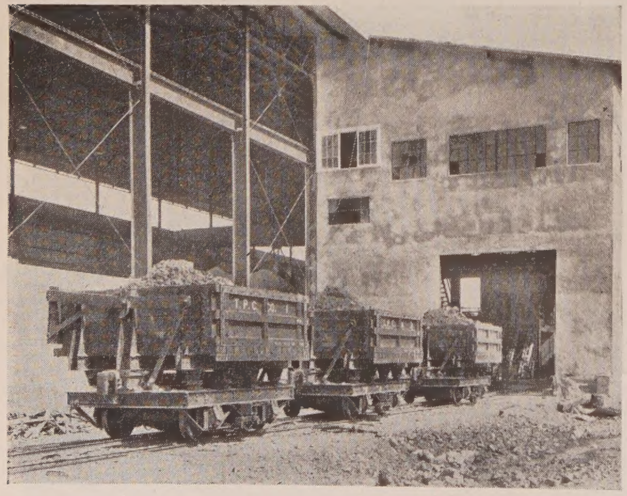


Fig. 3—Receiving end of crusher house attached to raw storage building in foreground. Woodford electric haulage system showing electric cars automatically operated by tower man exercising standard control over third rail system from quarry to crusher

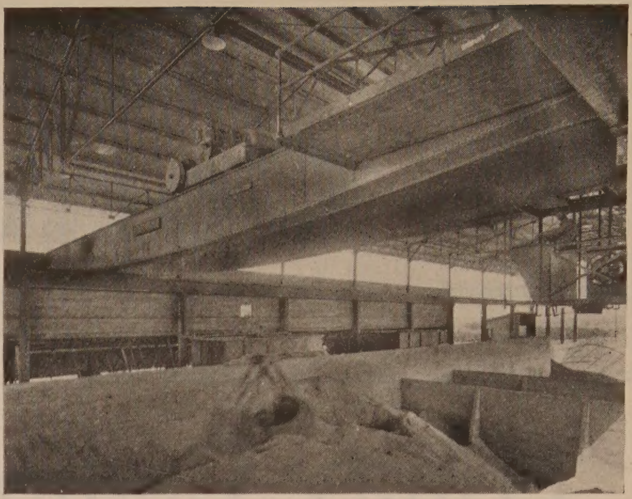


Fig. 4—Interior storage house. Dimensions 75 ft. by 360 ft., providing separate bins for clinker, gypsum rock and shale. Equipped with 6-ton Shepard electric crane

The cars are specially constructed dump cars of larger capacity and more rugged design than cars used at most cement plants for handling raw material. Each car carries its own automatic control apparatus, and the system is operating most efficiently.

The crushing plant consists of one No. 7 Mammoth Williams crusher[2], which discharges direct to a 42-in. open-top Link-Belt carrier.[3] The Williams mill is driven by a 250 h.p. General Electric motor,[4] and is fed by a Stephens-Adamson apron conveyor feeder[5] which insures uniform feed to the mill. The crushing department is built for much larger capacity than is needed at this time, as it can readily handle rock at the rate of 300 tons per hour.

Storage Facilities

The storage department was designed with the idea of large storage, not only for present but future needs. The storage house is of concrete and steel construction, 360 ft. long and 75 ft. wide. This building provides separate bins for storage of clinker, gypsum rock and shale. There is a capacity of 65,000 barrels of clinker, 1200 tons of gypsum and about 10,000 tons of rock and shale. The storage building is equipped with a 6-ton Sheppard electric crane,[6] 3-yd. clam shell bucket. The crane serves to distribute clinker and rock in the storage and reclaiming it by discharging it direct into large hoppers or tanks that serve both the finish and raw combination mills.

Grinding Department

The grinding department consists of one 7 by 26 ft. combination wet mill and one 7 by 26 ft. dry or finish mill. As these two mills are located or installed side by side it makes it possible to operate the entire raw and finish grinding with one man on a shift. As stated before, the raw materials are charged into the receiving hoppers of the combination mills which have special designed feeders that regulate the flow of the materials from the hoppers to the mills. This mill is equipped with two special designed feeders; one for rock and one for shale; each gives a uniform mix at all times. The water is admitted to the mixture as it enters the mill. The rock and shale entering the combination mill is discharged into a trough which leads to a pump and is pumped by Morris manganese lined centrifugal pumps[7] which are installed in two units, or in duplicate; and either one has ample capacity for the plant. The pumps discharge the slurry into six concrete slurry tanks, 16 ft. in diameter and 40 ft. high. In connection with the handling department there are two transfer pumps, and through the proper system of piping, it is possible to blend the slurry by transferring from one tank to another. Each tank has a capacity of practically 800 bbls. of clinker. From these tanks, slurry is transferred to the burning tank which is immediately under the feed end of the kiln, agitated by mechanical agitators furnished by the Bethlehem Foundry and Machinery Co. The slurry is again pumped by Morris pumps to a ferris wheel type conveyor which feeds it into the kiln; the over-flow running into the burning tanks.

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[1] Marion Shovel Co., Marion, Ohio.

[2] Williams Patent Crusher and Pulverizer Co., St. Louis, Mo.

[3] Link-Belt Co., Chicago, Ill.

[4] General Electric Co., Schenectady, N. Y.

[5] Stephens-Adamson Co., Aurora, Ill.

[6] Shepard Electric Crane and Hoist Co., Montour Falls, N. Y.

The kiln department consists of one kiln 11 ft. 3 in. by 70 ft. then 10 ft. by 180 ft., making a total length of 250 ft.; which is understood to be one of the largest kilns in operation at this time. Fuel oil is used for burning and the clinker is discharged from the kiln to a drag conveyor. This drag conveyor is on a refuge type chain, which delivers the clinker to a 36-in. Link-Belt pan conveyor. This conveyor delivers the clinker into the storage; where in turn it is again handled by the crane referred to in a previous paragraph. The function of the crane is to spread the clinker in the storage, and also to reclaim the clinker and discharge it into a hopper over the combination mill. The kiln is fired with oil which is furnished by local refineries, being transported to the plant in tank cars. The fuel oil is unloaded by gravity into four concrete oil tanks with a capacity of 6500 barrels. It is then pumped with a Worthington triple pump[8] with the required pressure to the kiln burners. The air for the combustion is furnished by a General Electric high pressure blower with a capacity of 2800 per minute. The kiln is equipped with a concrete stack 208 ft. high, built by the Weber Chimney Co., Chicago, Ill.

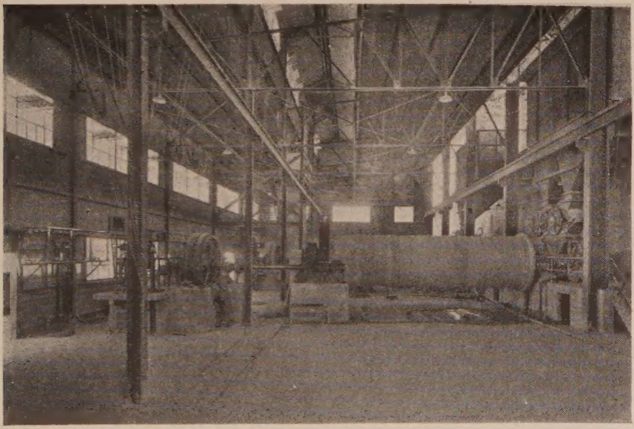

Fig. 5—Interior view of grinding room showing arrangement of combination wet mill and dry finish mill side by side operated by one shaft

The finish combination mill is similar to the wet mill, having special designed feeders that feed the clinker and gypsum in the right proportion to the mill. The capacity of this mill is approximately 75 barrels per hour of finished cement, 85% passing a 200 mesh sieve. The finished cement is discharged direct into an elevator, which in turn discharges on a belt conveyor furnished by the Link-Belt Co. There it is weighed over a Merrick Automatic Weightometer.[9] This belt conveyor carries the finished product to the top of a concrete silo type storage tank, having a capacity of 110,000 barrels of finished cement. The combination mills are each directly connected with a 500 h.p. General Electric super synchronous motor. After the cement is stored in the concrete silo tanks, it is packed out by means of four Bates Valve Bag packers[10]; two portable and two stationary types. The portable type packers, being installed immediately in the end of the silo bins, make it possible to pack cement without conveying or elevating. There are four 12 in. screw conveyors immediately under the floor where the portable packing machines are installed, and serve as tailing conveyors for the portable machines. They can also be used

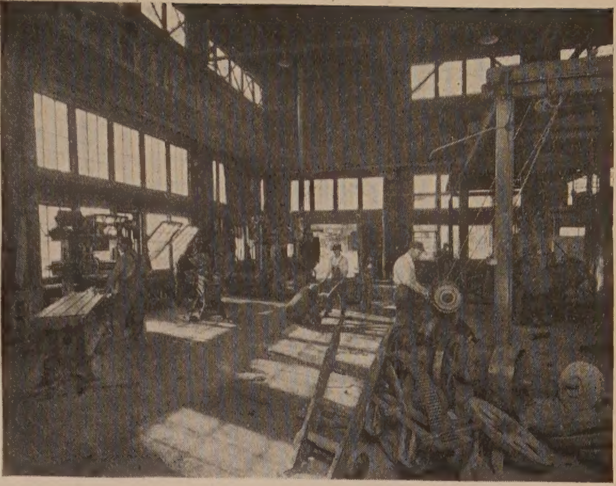

Fig. 6—Interior view of machine shop showing completely equipped plant shop with modern machinery throughout

Fig. 7—Glimpses of interiors of chemical laboratory and plant offices

for conveying cement to the stationary packing machines, since the bin is equipped with four special designed feeders, that in turn feed the cement from the bins to the 12 in. screw conveyors, and also carry the tailing and supply to the stationary packing machines as required.

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[7] Morris Machine Works, Baldwinsville, N. Y.
[8] Worthington Pump and Machinery Co., New York City.
[9] Merrick Scale Mfg. Co., Passaic, N. J.
[10] Bates Valve Bag Co., Chicago, Ill.

The sack handling department is a four story building which houses the two stationary packers and is equipped with a freight elevator, sack duster and necessary equipment for repairing sacks.

This building is specially lighted and ventilated with Lupton steel sash[11] and ribbed glass windows. The packing room and silo storage department directly adjoins the sack handling and storage building, and the whole is provided with canopied trackage and truck-loading docks, so that loading both for railroad and truck shipments can be handled with a minimum of trucking or conveying from packers or from storage.

Buildings

All buildings at the Fort Worth plant that are not of solid concrete were gunited. For the construction of the new plant, the company bought a complete gunite outfit, including a cement gun, using it for building up all the walls and roofs of every building except those like the large raw material storage and cement storage, the walls of which are solid concrete. This type of construction is permanent and gives a very nice appearance as compared with buildings covered with corrugated iron.

There is another large building 80 by 107 ft. and three stories high, which houses the completely equipped plant machine shop, the stock warehouse, the plant offices and the chemical laboratory.

All equipment of the machine shop is new and of the most improved type, including Lehman lathes,[12] Landis pipe threading and cutting machine,[13] American radial drill,[14] Gray planer,[15] Pels punch and shear,[16] complete blacksmith shop and other equipment constituting a fully adequate machine and repair shop. Most of the larger machines are equipped with direct connected motors while the smaller ones are driven from line shafts. The supply storage or stock room is large and well equipped with steel bins and steel shelving supplied by the Berger Manufacturing Co., New York City. The laboratory is spacious, well-lighted and ventilated, and equipped with the most advanced type of testing and experimental apparatus for cement laboratory work.

The offices are modern, light and equipped with the latest in modern office devices, including a circulation iced drinking water system, modern toilet and lavatory facilities, etc. All departments are separated by woven wire fence[17] manufactured by the Cyclone Fence Co.

Owing to favorable electric power rates made possible by the close proximity of the large plant of the Fort Worth Light & Power Co., the company purchases all of its current amounting to 2100 connected horsepower. The plant buildings include a very fine modern power house of concrete construction with large factory-glass, steel-sash windows. In this building are housed transformers, air compressors, switch boards and other miscellaneous equipment. All motors of 50 h.p. or more are 2200 volts and motors under 50 h.p. are 440 volts. The motor equipment is all furnished by the General Electric Co.; switchboards,[18] starting apparatus by Westinghouse Electric Manufacturing Co., transformers[19] by Allis-Chalmers Manufacturing Co., compressors[20] by Sullivan Machinery Co., and Worthington Pump and Machinery Co.

This plant, now in complete operation, is the result of a most exhaustive study on the part of the executives of the company, together with construction engineers, on plans, methods, systems and operating details employed throughout the cement industry. It is felt that all the arrangement of various units, machinery installations and general operating conditions have been made as nearly perfect as is possible up to this time.

Simplicity of design, massive concrete construction, competent cement mill operation by an organization long experienced in the cement industry, an almost inexhaustible supply of raw material and a vast and rapidly building territory surrounding it, assures the success and future of this great new plant.

Add to the already large output of the company's Dallas plant, Trinity brand cement is destined to become an even greater factor in the building of the great Southwest. The entire Trinity organization deserves a share of the credit, in the vision, the plan and the completed ideal represented by this splendid plant. The personnel includes the following: W. H. L. McCourtie, president; C. E. Ulrickson, vice-president and general manager; A. S. Parsons, sales manager; O. V. Bartholomew, general superintendent; A. A. Chaney, assistant superintendent; J. W. Ganser, chief chemist; G. G. Tomlinson, traffic manager; J. J. Horgan, purchasing agent; P. A. Bailey, auditor; J. F. Hayden, assistant secretary; Charles Hurst, chief engineer; W. O. Stuart, chief electrician.

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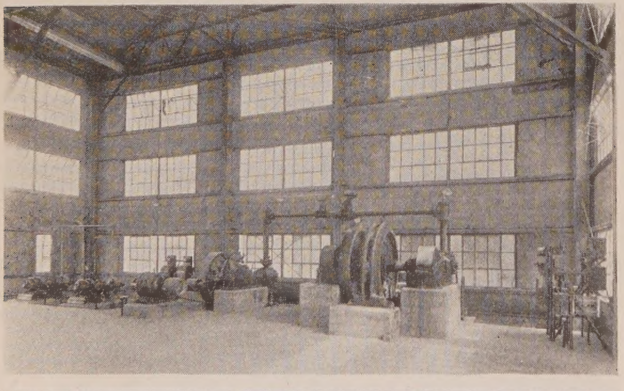
[11] David Lupton's, Sons, Philadlephia, Pa.
[12] American Wood Working Machine Co., Rochester, N. Y.
[13] Landis Machine Co., Waynesboro, Pa.
[14] American Tool Works, Cincinnati, Ohio.
[15] G. A. Gray Co., Cincinnati, Ohio.
[16] Henry Pels and Co., New York City.
[17] Cyclone Fence Co., Waukegan, Ill.
[18] Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.
[19] Allis-Chalmers Mfg. Co., Milwaukee, Wis.
[20] Sullivan Machinery Co., Chicago, Ill.



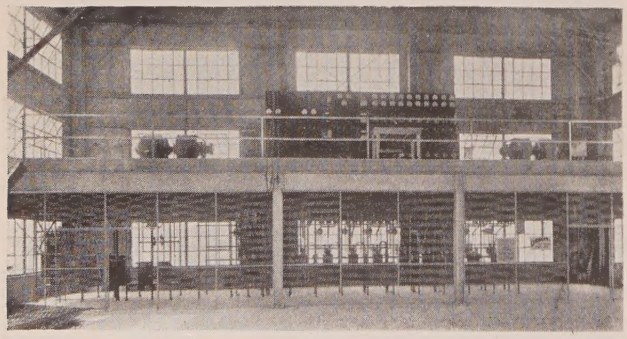


Fig. 8—Interior of power house showing transformers, air compressors and other equipment

Fig. 9—Modern switchboard installation in power house

Charles Boettcher of the Ideal Cement Co. has been appointed a member of the Denver Chamber of Commerce's committee to act in an advisory way to Wesley H. Lees, field secretary of the United States Chamber of Commerce.

Lubrication in Steel and Cement Mills

By J. A. MARLAND
Vacuum Oil Co., Chicago, Ill.

> Lubrication is one of the most important problems in cement mill operation. It requires particular study because of the wide range covered by the machinery and equipment used.
>
> The following article presented by Mr. Marland before the Western Society of Engineers, Chicago, Ill., and recorded in the Society's *Journal*, gives some interesting facts relative to development of lubrication methods in the steel and cement industries. Because of the fact that heavy gears are used under severe conditions there are some points of similarity in the methods used and the same fundamental principles are applicable in both fields.—*Editor.*

Rivalry and cut-throat competition in turning out steel as recorded in the history of early Carnegie and Bessemer days, was chiefly concerned with the development of machinery, which would insure the lowest production cost and greatest volume of output in the shortest possible time. New designs of mills brought changes in power transmission, in proportioning of those roll-mill members that showed weak points, as also in the arrangement of handling the material through its various stages to final completion.

Hand Oiling of Bearings

When steel mills were scrapped after only one year or six months production, due to development of more rapid production mills, perhaps it was just as economical to arrange for hand application of grease or oil to the mill bearings. This is, of course, with regard only to the length of life of the mill and without regard for oiling labor economies which could, perhaps, have been offset by an automatic oiling system to replace frequent manual attention.

As the weak points of steel mills were eliminated, and as the mill owners came to realize that fairly satisfactory progress had been made toward production speed they also came to realize that further improvement could be made in prolonging the life of the mill, as also in eliminating oiling or greasing labor charges and waste of lubricant by providing a continuous automatic lubricating system. Thus the development in the lubrication of steel mills, was toward continuous, automatic, positive oil delivery systems, with ample provision for draining and returning of oil to a central point. Such returned oil is automatically cleansed of impurities with which it may have become polluted while flowing through the hundreds of mill bearings. After the oil is thus purified to restore as nearly as possible its original characteristics, depending on its quality or chemical structure and purity, it is again ready for use.

Gear and Pinion Lubrication

In the problem of gear and pinion lubrication we find a more severe condition as regards the film-rupturing tendency, than is encountered on bearings, for the reason that shocks to bearings are transmitted through oil films spread over the bearing area, whereas shocks between gear or pinion teeth are transmitted practically through what might be called line contact. The best illustration of this point can be shown by comparison of bearing area pressures, which range as high as a few hundred pounds per square inch, whereas gear and pinion tooth pressures may range to several thousand pounds per lineal inch, assuming one engaging tooth. This latter computation is based on maximum power demand by one set of rolls which the pinions under consideration are driving, and assuming only one line of tooth contact.

Past practice in lubrication of gear teeth has invariably included the use of extremely viscous gear "dopes" or compounds. These were sometimes so thick as to require heating before application could be made with a paddle, or by simply pouring from a bucket. In many cases no provision was made for drainage or reuse of such a heavy gear dope. In other words, the entire volume of lubricant, by such application, ran to waste, with the exception of a small percentage which may have adhered to the teeth and gear sides or hubs.

Naturally, there was no great need for a highly refined or carefully selected lubricant under such conditions of use, and steel mill lubricant buyers came to the conclusion that the cheapest and probably the most viscous dopes would prove most economical and most satisfactory. Despite this apparent economy the lubricant cost per ton of production was much higher than by the present method, which is simply the continuous use of a carefully refined, high grade and properly selected lubricant, as has been employed in high speed turbo-generators for many years.

Continuous Gravity System

The use of this continuous automatic lubrication system has been gradually developed, within the last ten years. The first circulation systems included delivery and drainage of bearing oil only. This applied to bearings of the drive shafting. Naturally the engine bearing system had been in use for a much longer time, hence, this extension was nothing more than a slightly improved design of drive shaft bearings, so as to prevent excessive loss of oil and to permit its return through suitable piping. Later this system was extended to supply oil to pinion stand bearings.

The use of heavy gear dopes on pinion and gear teeth of continuous mills made it practically impossible to keep some of this extremely heavy, almost tar-like material from creeping into the bearing oil system, eventually clogging the flow of oil either in the drain lines or filters. This also endangered destruction of bearings through obstruction of oil flow at needle valves in the feed lines to bearings.

Simplified Central Circulation System Employing One Lubricant Only

Within the last few years experiments conducted in test shops and under actual working conditions, with the co-operation of engineers who have specialized in lubrication, have developed the fact that teeth of reduction gears, pinions and of driving gears, could be lubricated with an oil which would still be light enough to satisfy the bearing needs. This development came from careful study of viscosity-temperature conditions, occurring on heavy-duty reduction gear sets and pinion stands, where it was found that overheating of extremely viscous lubricants occurred until the resultant viscosity was but little higher than of such an oil as was just mentioned. This increase in temperatures of the extremely viscous gear dopes would naturally be caused both by the fluid or plastic friction of the dope itself, and also by the metallic friction developed between the gear teeth resulting from bare spots, where the heavy dope did not flow quickly enough to prevent metallic contact.

Bath Lubrication of Gears

The first attempt to employ the same oil for bearing, gear and pinion lubrication was simply a copy of the then existing practice, i. e., merely replacing the extremely heavy dope with oil. In other words, the oil was placed into the gear case and pinion stands, so as to bring the teeth below the level of the oil, depending on surface adhesion of the lubricant to carry it to the line of tooth mesh.

Although this plan proved satisfactory in some cases, probably where lineal pressures were not so great, it was found that dangerous overheating likewise occurred, thus proving that fluid or plastic friction alone was not the cause of overheating in such gear cases. Dissipation of heat from the gear case oil-bath was necessary. Pitch line speeds and centrifugal action also entered as serious factors.

Pressure Spray of Teeth

Applying the lesson which lubrication engineers had learned in the case of cutting-tool lubrication and cooling, we next developed the plan of positive pressure spray to gear and pinion teeth. This was done in such a manner as to insure a copious stream of oil along the entire line of mesh. Pressures of 10 to 30 lbs. in the oil line, at the point where connection is made to the spray nozzles have been found ample. This is, of course, within safe and satisfactory piping practice, being approximately in the range of oil pressures on turbo-generators, especially turbo-gear units.

One of the problems which next confronted these plants of "one oil lubrication" was the purification of the oil for removal of atmospheric impurities which would enter gear and bearing cases, even despite very close attention on the part of mill designers and builders to provide for dust tight construction. It is, of course, impossible to make such a system air tight which would include piping to hundreds of bearings, spread over a total run of several hundred feet, with many drainage connections. Water splash from the cooling supply to the rolls also was and is a factor, the water entering the oil system from the drain shelves of pinion stands. Other pollution which had to be considered and removed from the oil, was metallic particles which resulted from slight tooth abrasion where gear teeth had not been perfectly aligned, and also iron rust and scale from the large gear housings and piping, core sand from cast bearing pedestals, etc.

Manufacturers of oil equipment did their part in this economical progress by developing simple filtering equipment which helped to remove impurities, either by gravity precipitation or by passage through closely woven cloth. The use of centrifuges for removal of some finely metallic impurities has also been of value, better perhaps as an auxiliary, or super-fine method, in addition to the settling tanks and filters.

Since the use of one oil for both summer and winter service would be most desirable in the system of several thousand gallons capacity, another problem of correct performance during both winter and summer periods entered the situation. This problem was met in a very satisfactory manner by paralleling both oil feed and drainage lines with low pressure heating lines, and in some cases wrapping these together in a common insulating binder. To avoid "cracking" or decomposition of the lubricant, no direct contact of liquid oil and steam coils is permitted.

Further viscosity control for summer periods was provided by installing ample cooling coils in overhead gravity tanks. This provision controls the temperature of the oil very satisfactorily between extremes of 60° to 110° F. of the oil in feed lines. We have thus been able to employ a free-flowing lubricating oil which can be supplied with a gravity pressure of 25 to 40 pounds to regulating valves for all bearings of such a system, including enclosed carrier roll bearings, drive shaft bearings and gears, pinion bearings and teeth, also auxiliaries whose location may be limited only by the capacity of return drainage lines, although even this can be taken care of by providing several drainage sumps, and repumping to the main settling and filtering tanks.

The positive application of fluid or semi-fluid lubricants to roll neck bearings, either through high pressure application with lubricant compressor or grease guns, or through individual reservoirs, which will permit recirculation will probably replace the present method of hand application or tamping of grease into bearing pockets.

Roller Bearings

One of the most advanced steps along this line has been the development of dust-and-water-tight roller bearings, which are designed at the present time to take care of mills up to sixteen-inch size. The development of such bearings and the provision of means for their quick removal when changing rolls, thus insuring all the advantages of quick change which heretofore have been claimed for plain bearings, and without involving the disadvantages of bearing wear as occurs with plain type bearings under such extreme pressures, promises soon to be the standard practice in up-to-the-minute mills. The lubrication of such bearings will, naturally, be a simple and easy problem since it will involve nothing more than slip connections for oil circulation, or even a simpler plan of packing individual bearings with cylinder oil. Periodic renewal of such a lubricant, say once in several months, or once per year, depending on the effectiveness of the seal to exclude foreign matter, as also on the quality and stability of the lubricant, will replace the practice of frequent addition of extremely thick roll greases or oils as now employed.

Cement Mill Lubrication

Some of the most important cost items in cement mill production, wherein the efficiency of lubrication may be reflected, are the following:

a. Power.
b. Repair of parts due to frictional wear.
c. Depreciation of machinery.
d. Production interruption or decrease due to forced shut-down.
e. Cost of lubricants per unit of production.

Lubrication will reflect most favorably upon these items by adoption of the two basic principles, namely:

1. Correct selection of lubricants best adapted for use on the respective equipment, and under prevailing conditions of operation.
2. These lubricants must be properly applied to the equipment.

The last stated requisite is further qualified in actual practice by the necessity of conforming to existing design of bearings, gears and existing lubricating methods.

Further in this connection it must also be realized that the most important problem in the lubrication of cement-mill machinery, as we find it today, is that of excluding atmospheric abrasive materials from reaching the journal surface or lubricant film. In this case as also in the case of large machines in other industries, it is very difficult to design and build mill equipment with bearing and gear housing, where complete safety from dust intrusion would be assured.

Many ideas have been advanced to guard against such dust intrusion, some of these ideas succeeding to a surprising extent. These plans range from complete enclosure of gears and bearings with oil tight packing or gaskets surrounding the shaft, to partial enclosure of bearings only.

Although the partial-closure design has the drawback of allowing abrasive dust to associate with the lubricant to some degree, such design has nevertheless been a marked improvement over the policy which simply accepted the evil of dust contamination as unavoidable.

Quarry Equipment

The most important equipment, so far as lubrication is concerned in cement-mill quarries, includes air, steam or electrically operated drills, steam shovels and shifting engines or locomotives.

Steam or Air Drills

So far as application of the two basic principles above mentioned, can be made to steam or air drills, we have found that the most important step is to select properly compounded oils, and then to apply these as automatically as the design of the drills will permit. So-called "heart beat" oilers are, perhaps, most satisfactory for uniform delivery of oil to internal surface of such drills. In many cases the practice is simply to put in a small quantity of oil into the air or steam line or valve connection before the drill, at regular periods, thus providing some degree of uniform lubrication depending on the frequency of application.

Electric Drills

As a rule lubrication of electric drills is a very simple problem resolving itself to motor bearings and simple shafting or drum bearings, most of which are normal to slow speed with moderate pressures. Perhaps, the most specific requirement is that of a high grade electric motor oil or grease, which will remain in proper fluid form, even during extreme temperature changes. Although the plan to provide a special winter lubricant can be very easily arranged, it has sometimes been overlooked at different quarries resulting in destruction of motor bearings, due to use of an oil unsuitable to low temperature service.

Drill and Shovel Cables

Approximately the same condition of lubrication exists on electrically driven shovels, as already mentioned with regard to drills, excepting the additional wire rope or steel cable lubrication requirement which may require closer attention, due to the more severe shock service. This same condition applies to steam shovels.

The necessity for preserving and lubricating steel cables is of vital importance, although not generally appreciated. Especially is this true in the case of quarries where cables are exposed to the weather, with moisture penetrating the strands, thus endangering rusting of wires, and rotting of the hemp core. It is, of course, understood that whenever a cable or wire rope passes over a drum or sheave it not only rubs over the outer surface, but the individual strands rub on each other, and unless proper lubrication is provided on these rubbing surfaces, unnecessary wear occurs. Hence, in analyzing the lubricating requirements of cable or wire rope, we consider the case as we would a piece of machinery, having many wearing surfaces that must be thoroughly lubricated. This analysis leads us to the selection of the lubricant which should consist of a heavy viscous oil, that will penetrate between the wires and strands, as also to form an elastic coating on the exterior. It should not harden on the outside, as this would allow the lubricant to crack in bending over the sheaves, thus permitting moisture to penetrate to the center and cause internal corrosion.

Tar should never be used as it forms a hard shield on the outside of the rope and does not penetrate to the inner parts.

Before application of the lubricant the cable or rope should be perfectly clean and dry. The lubricant should be applied hot whenever possible, thus rendering it sufficiently fluid for penetration and thorough distribution through the internal section of the rope. Subsequent cooling will thicken the oil to its original consistency, under which conditions it will have the necessary adhesive properties to maintain a continuous film on all of the wire surfaces. We have found that approximately one gallon of such lubricant should properly saturate and lubricate twenty feet of rope. Expressed in another way each foot of cable will require about one and one-half gallons per year. Where a rope or cable is kept in continuous daily use it may require at least one thorough application of such lubricant per week. In some cases this application may be required daily depending upon the speed of the service.

Steam Shovels

The wear and tear of steams shovels is very much greater than on almost any other kind of equipment, due to the fact that they are continuously exposed to all kinds of weather, and being employed for work which subjects the mechanism to a very severe operating strain. Both of these adverse conditions shorten the useful service of the shovel, that is its earning capacity.

Internal lubrication of steam valves and cylinders can be best arranged by selection and use of a properly compounded oil to insure adhesion on hot, wet surfaces. Automatic application of such an oil from mechanical lubricators through atomizers, as is customary for larger stationary steam engines, completes the care of internal lubrication.

Where automatic lubricating devices, such as sight feed oilers or wick feed cups, are provided on bearings of steam shovels, the use of a good quality oil, selected with proper regard to ability to stay on the rubbing surfaces for a maximum period, will be the most beneficial. Where bearings are fitted with grease cups or high pressure grease compressor fittings, the use of a non-drying, non-caking, medium consistency grease will be found most satisfactory.

Crushers

Crushers are large, heavy, hard-working machines used for breaking the quarry product, and because of the extreme importance that all heavy-duty frictional surfaces be amply provided with a suitable lubricant, this is one of the cases where the principle of automatic continuous circulation best serves to prevent metallic abrasion, and decreased life of the unit.

Provision for continuous circulation of properly refined high grade oils to such bearings and gears as found on gyratory crushers, is a standard design with some of the leading crusher manufacturers. To a lesser degree, automatic application especially on jaw and roll crushers is provided through use of ring-oiled or chain-oiled main bearings. Pitman bearings on jaw crushers can be very satisfactorily lubricated by means of wick or drop oilers, feeding through dust-tight connections to waste-packed reservoirs from which the oil passes to the bearings.

Compeb and Kominuter Bearings

Although grease lubrication of such bearings has been accepted as fairly satisfactory in many cement mills, we have recently had the opportunity of developing even more satisfactory lubrication through the use of properly refined lubricating oils, automatically applied. No change in bearing design or construction was involved, with the exception of a simple provision to exclude dust at the bearing caps and at bearing ends.

Due to the comparatively large size of such bearings this provision of guarding against dust intrusion, with a simple padding of felt and oil saturated wool waste, permitted economies of power saving, and frictional temperature reduction, to be realized.

This advantage was chiefly obtained through substitution of a fresh automatic supply of oil along the entire bearing surface, in replacement of a heavy packing of grease, which soon became charred or glazed where it laid in contact with the journal. In fact it is not an uncommon matter to find deeply scored journals and badly worn bearings on such mills.

Since each form of bearing design on already existing compeb and tube mills must be treated as a separate case, it is impossible to specify any general type of device for use on such bearings, except that the oiling device itself, that is the wick or gravity feed oiler may be of a very simple standard type, so long as it allows for desired adjustment of oil feed.

A few pints of correctly selected oil per week on a large bearing of compeb or tube mills, is usually ample if properly applied so that the economy of this means of lubrication, with regard to the lubricant cost itself, is also a favorable factor, although not by any means of prime importance.

Labor Saving

One of the important advantages assured by this plan of automatic lubrication, aside from the advantages of power saving and greater safety by maintenance of a continuous fresh lubricating film in the bearing, is that of freedom from the need for frequent labor attention. This is achieved by the use of oiling devices of suitable size, so as to provide ample feed for periods of at least several days between attention.

Automatic lubrication of conveyor bearings is limited to ball or roller type bearings, where these are incased in lubricant-tight housings. Other types of conveyor bearings, usually provided with grease compressor fittings or grease cups, naturally, will continue to require manual attention from time to time.

New Analytical Procedure for Limestone

By W. E. HASKELL

Analytical Chemist, Hollister, California

The writer recently had occasion to analyze a large number of high grade limestone samples to be used in the manufacture of portland cement in which the percentages of silica, and iron and alumina, were each less than 2.0%, and in which a separation of iron and alumina was required.

The usual procedure in this laboratory is to determine the iron in a separate sample by means of the Zimmerman-Reinhardt method, and subtract this value from that of the total oxides. Because of the small iron content of the limestone (less than 0.5%) it was thought that a colorimetric method could be used advantageously, and a method has been devised wherein the analysis can be completed on one weighed sample, determining silica, iron, alumina, calcium oxide, magnesium oxide and ignition loss.

The reagents necessary in addition to the usual ones are a standard iron solution made by dissolving about 0.15 grams of pure iron wire in 10 c.c. of hydrochloric acid and 5 c.c. of nitric acid and diluting to one liter; a 5% solution of ammonium thyocyanate and 60% perchloric acid.

Comparative analyses show that no appreciable error is introduced by the addition of the ammonium thyocyanate, and that the use of perchloric acid renders a second evaporation unnecessary. The procedure is as follows:

0.5 gram of the finely ground sample is weighed into a tarred platinum crucible and ignited for one-half hour, cooled and weighed. The difference in weight is the loss on ignition.

One gram of sodium carbonate is then added to the sample in the crucible and thoroughly mixed and the crucible heated over the blast lamp until the contents are in a state of quiet fusion.

The crucible is removed from the flame and the contents dissolved in 10 c.c. of 1-1 hydrochloric acid and 1 c.c. of nitric acid in a porcelain casserole. The solution is cooled and transferred to a comparison tube graduated in c.c. using as little wash water as possible, 5 c.c. thyocyanate added and compared with a few c.c. of the standard (1 c.c. to 5 c.c.) contained in a similar tube. Either of the solutions are diluted until the colors exactly match, and the percentage of iron determined by means of the formula

$$X = \frac{a \times b \times c}{A \times W}$$

in which a = number of c.c. of standard solution placed in tube.

A = number of c.c. to which it is diluted to produce the same shade as the rock sample diluted to b.c.c.

c = metallic iron value per c.c. of standard solution.

w = weight of sample.

X = per cent of metallic iron in sample.

From this weight the percentage of ferric oxide is calculated.

The solution of the sample in the comparison tube is then transferred to the casserole, 5 c.c. of perchloric acid added and evaporated to dryness.

The evaporation is then taken up in 20 c.c. of 1-1 hydrochloric acid and the analyses completed in the usual way.

Summary

By using a colorimetric method it is unnecessary to weigh out a separate sample for determination of iron, and small amounts are more accurately determined than by titration with permanganate.

The use of perchloric acid oxidizes the sulphur introduced in the ammonium thyocynanate and also acts as a dehydrating agent and renders unnecessary a second evaporation.

The magnesia may be determined by precipitation or if below 4% by using the photometric method.

The procedure is accurate for small amounts of iron and the analysis is considerably shortened thereby.

Gypsum Company Starts Extensive Plant Additions

Type of Construction of Storage Bins and Methods of Handling Rock Are Similar to Practice in Cement Industry

Important additions are being made to two of the United States Gypsum Company's plants. At Staten Island, New York, an unusual construction is being carried on to provide additional rock-storage capacity, and a new specialty plant is being added to the property at Gypsum, Ohio.

Storage Plant at Staten Island

Eight "skyscraper silos," the tallest of their diameter in the world, are being erected at the Staten Island factory by the General Contracting Co. of New York City. The reinforced concrete tanks have walls 9 in. thick, 56 ft. in diameter and 70 ft. high, exclusive of the steel roofs and galleries that will surmount them. More than 10,000 barrels of portland cement are being required for their erection and removable forms are being used which make it possible to pour concrete 24 hours a day.

This plant is the only one in the American gypsum industry for which the raw material is imported rock. Gypsum is brought down from Nova Scotia by a fleet of boats owned and operated by the United States Gypsum Co. Owing to the peculiar conditions in the Bay of Fundy, navigation usually is closed four months of the year. With the present tendency of the building industry to carry on operations throughout the Winter, it is necessary to operate the plant at capacity all year in order to supply wall plaster to the Atlantic Coast states. With the increased demand made in those centers, additional rock storage capacity has become necessary.

Each of the silos will contain 7,500 tons which, with present facilities, will make the total storage capacity at the mill in excess of 100,000 tons. This will provide material for capacity operation throughout the Winter.

With this construction, all the rest of the receiving equipment on the property is being revised. Dockage is being repaired, brought out to the bulk-head line, resurfaced with concrete and extended to a total length of 2,000 ft. One Maine electric traveling gantry crane with 2½-ton clamshell bucket is being installed now, and another one will be added in near future. This will make it possible to unload rock from the boats at the rate of 500 tons an hour which, in turn, will permit of more cargo-trips during the shipping season.

The silos are placed on a footing of piles. Over this, a solid block of reinforced concrete, 2 ft., 3 inches thick, has been laid, and the silos are being built above that.

Gypsum rock will be lifted from the boats by the gantrys, which will deposit it on a 36-in. belt conveyor running parallel to the silos. After passing over a weightometer it will be elevated to the two receiving silos, situated nearest the plant. From the bottoms of these it will be withdrawn and conveyed mechanically to the crusher building, where it will be reduced in size and then passed over a set of Hummer screens. The fines will be used immediately. The lay-out is so arranged that the remaining rock may be processed at once or returned to the storage silos or to the old storage bins.

Rock intended for the storage silos will be elevated to a belt conveyor running the entire length of the silo-series, from which it will be discharged into the desired compartment. All the tanks will be roofed with steel so as to keep the material dry. Two units will be reserved for the white rock which is obtained in Canada from which specialties are made. The others will be filled with material for wall plaster.

This construction was started May 1. It is scheduled for completion September 1 and two months later the silos are expected to be filled with 60,000 tons of Canadian rock.

Portland Cement in June, 1925

Shipments of portland cement during the month of June were the highest ever recorded in the United States for any month, according to statistics compiled by the Bureau of Mines, Department of Commerce. Production of this commodity also approached a record mark, the month's output having been exceeded only by that of May, 1925. Portland cement stocks show a seasonal decline, but are still at high levels, and are over 9% greater than in June, 1924. The production for June is given as 15,387,000 bbls., the figures being based upon reports of producers mainly but including estimates for one plant. Shipments were 17,501,000 bbls. for the same month and the stocks on hand at the end of June, 16,326,000.

Stocks of clinker, or unground cement, at the mills at the end of June, 1925, amounted to about 7,928,000 bbls. compared with 9,053,000 bbls. (revised) at the beginning of the month.

Statistics as to imports and exports for the month of June are not available. Records of the Bureau of Foreign and Domestic Commerce give imports of hydraulic cement for May as 186,897 bbls., valued at $286,959. Exports for the same month were 85,385 bbls. valued at $250,855. Domestic hydraulic cement shipped to Alaska, Hawaii and Porto Rico in May amounted to 25,277 bbls. valued at $55,696.

The Phoenix Portland Cement Co. has erected an electric sign on top of its concrete storage silo at Nazareth, Pa.

New Cement Plant for Florida

Official announcement of plans for the erection of a $5,000,000 cement plant at Tampa, Fla., was made recently by John L. Senior, president of the Cowham Engineering Co. of Chicago.

The new company to operate in Florida will be another Cowham Engineering Co. undertaking, and will have a separate charter.

Announcement of plans for the new industry were made by Mr. Senior through H. J. Weeks, secretary and assistant general manager of the Signal Mountain Portland Cement Co. and secretary of the Cowham Engineering Co. of Chicago. Mr. Senior is president of the Signal Mountain company and the engineering company.

The engineering company has spent more than a year in making its investigations in Florida, having spent over $50,000 in this work. In the past it has been the idea of the cement industry that the suitable raw materials were not available in Florida for the production of portland cement. The investigations of the Cowham company have proven that this is not the case, for suitable raw materials have been located in Tampa for the production of a cement of exceptional quality. In addition the materials on the acreage purchased for the new Florida enterprise will make a cement peculiarly suited to construction in the South. The cement made from these materials will be almost white.

Definite announcement is made that construction of the plant will be started within the next 60 days. The plant will have an initial capacity of 2,500,000 barrels of portland cement annually.

Another interesting feature in connection with the Florida development is that it will be the first company to enter that state for the production of cement, for which there is a steadily increasing demand in the South in line with the remarkable development of this section of the country, particularly during the past few years.

The name selected for the new Florida company has not yet been announced. Other details of the organization are anticipated within a short time.

International System Acquires Birmingham Plant

On July 1 the Southern business of the Phoenix Portland Cement Co. and its interest in the Birmingham plant passed, through sale, to the Alabama Portland Cement Co. of Birmingham, a member of the International System.

During the last two years the Phoenix company has established itself as a producer of the highest quality of portland cement. Sincere thanks are extended in an announcement by Lindley C. Morton to the company's many friends who have made its success possible.

In other sections of the country the members of the International System have established enviable reputations for a product of superior quality and for business ethics of the highest order, and confidence is expressed that the Alabama company will maintain the Phoenix reputation for high quality of cement.

The Alabama Portland Cement Co. will operate under policies developed in over 20 years experience in cement manufacture and merchandising which policies are followed by the other eight companies in the International System.

The management of the company is now vested in men who are thoroughly schooled in these policies and methods which are in large measure responsible for the present size and strength of the International System:

H. Struckmann, president; J. W. Johnston, vice-president and manager; C. C. Duff, treasurer; S. C. McCurdy will continue as sales manager.

In common with other members of the International System, the Alabama Portland Cement Co. will manufacture Lone Star cement.

Unbounded faith in the South is demonstrated by the addition of this, its largest cement mill, to the International System. With producing mills at Birmingham, Dallas and Houston and a plant nearing completion at Norfolk, the South is thus provided with an annual capacity of over 5,000,000 barrels of home production, assuring unsurpassed delivery service to Lone Star users.

An inflexible part of the policy followed by this company is "To deal with each customer as though both buyer and seller were members of the same organization."

The new management has announced that it is determined to produce a quality of cement for the people of Alabama and neighboring states as nearly perfect as present engineering knowledge and science can make it.

Novel Rock Drilling Contest

At the Imaim Amohalko fiesta, held at Miami, Oklahoma, on July 3, there was witnessed by a holiday crowd of 10,000 people a rock drilling machine contest in which ten teams participated, each consisting of two men representing different mines in the district.

The work consisted of drilling a single hole through an 8-ft. block of concrete which was mounted upon a railway flat car and hauled over the tracks of the electric railway to the center of the city.

The stipulations of the contest required that each team carry the drilling machine a given distance, mount it upon a tripod and drill a round hole through the concrete block, after which the machine was to be removed from the tripod and both placed in their original position.

The drilling team from the Beaver Mine with a Gilman heavy drifter type of hammer rock drill won the contest by accomplishing the work in a total elapsed period of four minutes and one second. The team employing a Sullivan make of rock drill won second place by completing the work in four minutes and thirty-four seconds, while a team from the Grace Walker Mine with another Gilman drill won an easy third place by finishing in exactly four minutes and thirty-five seconds.

The Gilman rock drill employed in the contest is manufactured by the Gilman Manufacturing Co., East Boston, of which George H. Gilman, is president, and to whom CONCRETE is indebted for the above information.

Complaint Against Cement Securities Dismissed

The Federal Trade Commission has dismissed a complaint brought against the Cement Securities Co. of Denver, in 1920, alleging that combining the stock and assets of the Oklahoma Portland Cement Co., of Ada, the United States Portland Cement Co., of Denver, and the Nebraska Cement Co., of Superior, was a violation of the Clayton Act in that it tended to create a monopoly and lessen competition in the cement industry. Dismissal of the complaint was recommended by the Commission's chief counsel, William H. Fuller, and the order of dismissal entered by a 3 to 2 vote, Commissioners Nugent and Thompson dissenting.

Pneumatic Drill with Governor

A new line of four-cylinder drills, including both reversible and non-reversible sizes has been placed on the market by the Ingersoll-Rand Co., New York City. These machines contain many advanced features which all tend to give greater reliability, more efficient operation and reduced drill maintenance costs, according to the manufacturers.

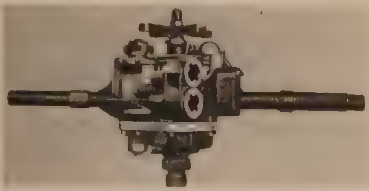


Fig. 1—Ingersoll-Rand reversible long stroke drill partly in section showing helical gearing, piston, cylinder liners and crankshaft

These drills are claimed to be the only ones equipped with speed governors which automatically prevent racing the drills beyond a safe working speed. The governor saves on air consumption and prevents wear and tear on the drill parts. Among other special features is the new type of cylinder liner, of special steel fitted into the steel casing and easily removable.

Automatic Belt Contactor

The accompanying illustration shows the "U. G." automatic belt contactor put out by the T. B. Wood's Sons Co., Chambersburg, Pa. This is a practically new device with the Wood company, and is a modern refinement of the old swinging type belt tightener.

It is pointed out by the manufacturers that this equipment accomplishes its results in a different way than the old types. Tractive effort is increased by wrapping the belt around pulleys, by increasing the arc of contact, and not by setting up heavy and destructive initial belt tension. The contactor pulley automatically swings around between the driving and the driven pulleys and increases the arc of contact and reduces the belt tension but keeps a constant tension in the slack side, not more than half the tension in the slack side of an open belt when at work. This constant tension in the slack side is maintained as the load increases or decreases.

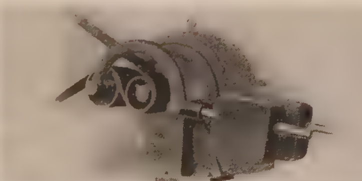


Fig. 1—The "U. G." automatic belt contactor for belt drives

This equipment is especially recommended by the manufacturers for short center drives, once considered impossible, and ratios of pulley diameters said to be impractical.

Heavy Gasoline Locomotive

To meet the prevailing demand for heavier gasoline locomotives, the Vulcan Iron Works, Wilkes-Barre, Pa., has recently developed a new 20-ton machine known as model HS-20. The locomotive is powered with a 6-cylinder, 125 horse power motor, equipped with modern accessories such as electric starter and generator, Stromberg carburetor and storage battery.

Steam locomotive practice is followed very closely in the chassis construction, the frames being of open hearth cast steel.

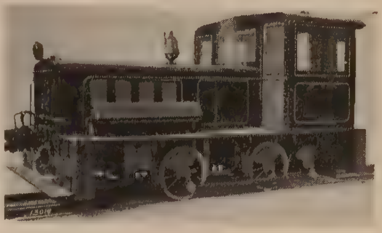


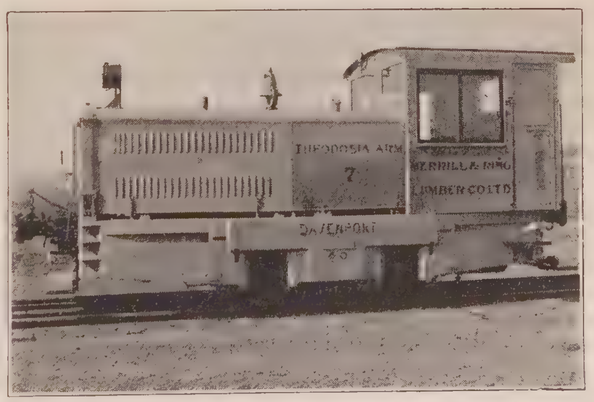
Fig. 1—New 20-ton Vulcan gasoline locomotive

The final drive is by means of driving and parallel rods from cranks on the jack shaft to the crank pins in the driving wheels, traction being thus provided on all four wheels. The locomotive is designed for four speeds forward and four speeds reverse, geared from two to 15 miles per hour with a maximum drawbar pull of 12,000 lbs. It has a comparatively short wheel base to negotiate reasonably short curves.

Better Lines in Locomotives

A decided tendency toward more attractive lines in gasoline locomotive construction is seen in the new 20-ton model designed by the Davenport Locomotive Works, Davenport, Iowa. With the long, slightly tapering hood and all-steel cab resting on a rugged, well designed under-frame, an appearance of balance and power is achieved that is in keeping with the service a machine of this type renders. There are no hang-overs from steam locomotive design—all the parts and units in this new design being placed with efficiency and accessibility as the most important consideration.

Roller chain transmission has been adopted since it reduces friction and wear to a minimum, gives higher mechanical efficiency, and furnishes a semi-elastic driving medium that protects the entire mechanism from shock. The four driving wheels have steel tires and are individually driven on four short axles of large diameter riding in Timken roller bearings which take both the side thrust and weight of the locomotive. This individual wheel drive gives remarkable tracking qualities, each wheel acting independently to hold the rail under all conditions.



Long, low hung and powerful, the design of this new 20-ton Davenport gasoline locomotive is an example of the marked tendency on the part of locomotive manufacturers to improve the lines of their product

Labor Plentiful in Canadian Lime Field

Never before has labor been so abundant for lime manufacturing in eastern Canada. In past seasons, many of the lime manufacturing companies have been handicapped because of a dearth of labor, although few of the companies have been hampered by strikes. This season, owing to a slump in the lumbering industry and the non-operation of 80% of the coal mines, there are enough men available to assure the 100% operation of all the lime plants in the eastern provinces all through the season.

With the closing of the mines, because of a strike, or lockout, approximately 14,000 men became idle. Lime manufacturers in the vicinity of the mines who had operated but spasmodically during the past few years, started operations at capacity early in the current season. The erstwhile miners were secured to operate the plants, at wages that were satisfactory to the lime interests. In one instance, a set of lime kilns that had not been worked for ten years, began manufacturing lime, with the operations in charge of ex-miners entirely. In another instance, striking miners took over the operations at a set of three kilns, that had not been operated for two years, the basis of payment being a royalty on each barrel of lime produced. The owners of the lime kilns, have no interest in the operations outside of noting the number of barrels of the lime manufactured. This lime is sold to United States parties who transport it to the ports of Boston, New York, Providence, Portland, etc.

Safety Measures Adopted

Lime manufacturers of eastern Canada have joined with lumbermen and pulp and paper executives, in a plan destined to reduce the number of accidents in plants affecting the three allied industries. An organization was formed which has been styled the New Brunswick Safety League. It is to cover the province of New Brunswick. The plans tentatively agreed on for this year call for lectures on precautionary methods before audiences composed of employes of the plants. Foremen will also be instructed and trained in safety methods, and crews drilled in first aid treatments. However, the chief objective is to inculcate in foremen and subordinate employes the necessity of looking before they leap in working about machinery, particularly, but generally in their daily duties.

It is felt that many of the accidents including those that result in death can be attributed to carelessness. In New Brunswick a death while at work whether due to carelessness or not costs the employer $1,800, under the compensation laws for workmen. In cases of injury, the assessments against the employers are very high. And each year finds the rates ascending.

It is the goal of the league to so instill in the minds of employes the advisability of using caution in their work that the costs of workman's compensation to the lime manufacturers will be lower than at present prevailing. It is believed that in the past foremen and superintendents have been rather lax in seeing that employes used caution about the plants and that at least 35% of the accidents were unavoidable. If the number of accidents can be reduced materially, the work of the safety league will be highly profitable to the lime manufacturers.

W. E. Anderson, the secretary of the league, is at present in charge of the league's activities. Under his supervision, the lectures are delivered at the various plants. Printed cards are also distributed to employers for posting in conspicuous places, these cards bearing warnings to act cautiously while at work. The cooperation of all employers is being sought. It is the intention of the league officials to hammer away until the objective is reached—namely the reduction of the number of accidents. Even a small reduction will be achieving something worth while, as annually in New Brunswick, the accidents have been increasing to an alarming degree, in hazardous occupations, regardless of how slight the hazard.

Chemical Equipment Exposition a Success

With registered technical and industrial visitors' attendance of 1043 from 22 states, Canada, Italy and Czechoslovakia and with a range of exhibits covering the entire field of essential processing equipment and materials, the first Chemical Equipment Exposition, promoted and managed by the Association of Chemical Equipment Manufacturers, New York, opened in the State Armory, Providence, June 22 and came to a successful conclusion on Saturday, June 27.

Fig. 1—Part of Chemical Equipment Exposition, Providence

The Exposition was held throughout the week in which the American Institute of Chemical Engineers held semi-annual four-day sessions in Providence. In conjunction with the Exposition also occurred special sessions of a section of the American Chemical Society, the Providence Engineering Society and sections of the American Association of Textile Chemists and Colorists.

All told, 1573 persons directly interested in the processing industries and in chemical engineering's and chemical equipment's services and adaptations thereto, inspected or participated in the Exposition.

British-Made Aluminous Cement

Cement manufacturers in England have been quick in dealing with the situation created by the importation of aluminous cement from France. Their first answer to this new form of competition was the production of rapid-hardening portland cement and its sale at a price only slightly above that of ordinary portland cement. Their second answer is the production of the new "Lightning" brand aluminous cement, supplied at a price lower than that of similar products of foreign origin, and enabling concrete made with it to attain in 1 day a strength equal to that of ordinary portland cement at 100 days.

G. B. Arthur Assistant to Lime Association President

The Board of Directors of the National Lime Association at a meeting held in Chicago on July 9, 1925, approved the following changes in policy and personnel of the association.

G. B. Arthur, district manager of the central division, Chicago, was appointed assistant to the president, with direct general charge of all scientific, technical, research, field and general publicity work of the association and its divisions.

The purpose of this move was to relieve Burton A. Ford, secretary and general manager, of certain technical supervision so that he might be able to devote all of his time to the increasing secretarial and business duties of the association. It also places Mr. Arthur, a man who is a trained engineer, in general charge of the technical and field work so as to bring about a direct tying-in and coordination of the research work with the field work. Mr. Arthur is well qualified for the position by virtue of his three years of efficient work as manager of the central division. The appointment of a successor to Mr. Arthur as district manager will shortly be made. He will continue in general direction of the district field managers, when selected by the divisions.

Men and Mills

Notes from the Field

In the third attempt to establish a "no-accident month," the Marquette Cement Company's plant at Cape Girardeau, Mo., was successful during June, going through the month without an accident. During the past year and a half such tests have been made but each time previously some accident has come up to spoil the record. The local plant is competing with the LaSalle, Ill., plant in the no-accident contest. Sales headquarters of the local plant are in Memphis, Tenn.

The Union Pacific Railroad Company when oil was discovered in the Fort Collins and Wellington, Colorado, country, extended its Denver-Fort Collins line so as to serve the oil fields, calling the addenda the Buckeye branch. One of the stations along the new line was called Flavin.

Because of its many natural advantages, the Ideal Cement Co. selected a site for its $2,000,000 cement plant in this section of Colorado and to serve the cement plant it was found that a two-mile spur would have to be built from Flavin.

When this was decided, the railway officials changed the name of the station from Flavin to Boettcher, and henceforth it will be Boettcher, Colorado, a tribute to Charles and Claude K. Boettcher, father and son.

Australia is at the present time manufacturing between 750,000 and 1,000,000 tons of cement all of which is being bagged in Gunny twill bags. It is put up in approximately 18 bags to the ton, each bag containing about 125 lbs. The bags are manufactured in Australia from twill cloth imported from Calcutta. The cement manufacturers in Australia are therefore using at least 15,000,000 Gunny twill cement bags per year. The more modern methods of bagging adopted by American cement manufacturers have not as yet been introduced into Australia.

Sellar Bullard, formerly connected with F. B. Hitchcock & Co., investment bankers, has become associated with the Marquette Cement Manufacturing Co., as a vice-president, according to an announcement sent out by the Marquette company.

E. J. Ochs, formerly connected with the Cowell Portland Cement Co., at Cowell, Calif., is now with the Standard Portland Cement Co., Zanesville, Ohio. H. R. Brandenburg is cheif chemist of the Cowell Portland Cement Co.

J. E. Zahn, of the United States Portland Cement Co., isn't busy enough as general manager and secretary of that concern, he has accepted the secretaryship of Sunshine Mission, a charitable institution of the Mile-high city.

The Ideal Cement company's plant being erected near Fort Collins, Colorado, is to be a large consumer of the natural gas recently discovered in that section. The initial gas will be used in firing the kilns, the hot gases then going to the waste heat boilers to supply steam for the electrical plant.

Stanley Sommel left recently for Iola, Kan., where he will spend the next month attending a trade school. After the completion of his course he will take charge of the bag department at the Knickerbocker cement plant at Hudson, N. Y.

The Whitehall Cement Co. is busily engaged these days delivering the winter's supply of coal to its employees, ordered some time ago through the company.

Upwards of 400 employes of the Lehigh Portland Cement Co., from both the office and mill, enjoyed the company's annual clam bake at Neff's park, Neffsville. Music was furnished by the police band, and an excellent "feed," including many other edibles, in addition to clams, which made up the principal course, was served on the dance pavilion.

The Gulf States Portland Cement Co., Demopolis, Ala., has work under way on extensions and improvements at its mill, to include the installation of grinding equipment, kiln, and other apparatus. It has contracted with the Alabama Power Co. for power supply.

The formal openings of Batesville's new quarter-million-dollar hydrated lime manufacturing plant was witnessed June 28 by members of the local Chamber of Commerce, who laid aside business cares and turned out 100 strong to spend the afternoon at Limedale, the seat of the newly finished plant, just west of the city. General Manager George Weigart and Frank Perrin, a leading stockholder in the company, had put all machinery of the establishment in perfect trim for making a practical demonstration of the processes that break the stone from the native quarries nearby, conduct it on cars over tramways and dump it from an elevation of 50 ft. into the red-hot kilns, from which the commercial product, in the form of premium grade lime emerges and then goes to the hydrating department and then finally comes out in the consistency of the whitest of wheat flour.

The daily capacity of this plant is around 600 bbls., and employment is afforded for 100 men.

H. P. Rodgers, 508 Leader-News Bldg., Cleveland, Ohio, has been appointed district representative for the Cleveland territory of the Pennsylvania Pump & Compressor Co., Easton, Pa. Mr. Rodgers' products are: the Pennsylvania air compressors, both in single and double stage types, including direct connected gasoline driven portable compressors, and centrifugal pumps of the double suction single stage and multi-stage types, including a small pump for brine and water circulation and a portable unit known as the Penway pumper; also air lift pumps.

James McGraw, Inc., 10th and Carey Sts., Richmond, Va., has been appointed district representative for the Pennsylvania company in its Virginia territory.

About 60 of the male employees of the Edison Portland Cement Co., New Village, N. J., recently visited Andersontown where a chicken and waffle dinner was served. Several officials of the company from the offices in Orange, N. J., were present as guests.

The Missouri Portland Cement Co., recently put into commission, two new steel barges built to transport the company's product on the Mississippi. The boats were built at Dubuque, Ia.

The striking packers of mills in the Lehigh district returned to work when the companies granted their demand for a 10% increase in wages. The new rate is said to be $2.19 for packing 100 barrels of cement (400 bags) to the packing crew of four men.

Ralph P. Schelly of Rosemont, Pa., was found dead near his home.

He was a graduate of Blair Academy, Blairstown, N. J., and at Lafayette college, class of 1909, and formerly chief chemist for the International Portland Cement Co., of Spokane, Wash., and chemical engineer for the Fuller-Lehigh Co., Fullerton, for seven years.

The Gibney Iron & Steel Co., Phillipsburg, has been given the contract to dismantle and raze the buildings of the Alpha Portland Cement Co. at Alpha, Pa., known as Plant No. 2, and work has already been started.

Some months ago the Gibney company razed the buildings that composed Plant No. 1.

When the buildings composing Plant No. 2 have been dismantled and razed there will be nothing remaining of the former active Alpha Portland Cement Co. in the borough of Alpha.

During the month of June the Newaygo Portland Cement Co., Newaygo, Mich., exceeded all records established during 25 years of manufacturing; all production and shipping records being broken.

During this period the cement company shipped 140,020 bbls. of cement or 560,080 sacks.

Production records were smashed during the month with an output of 90,000 bbls., practically a 100% output.

The chief aid in the making of these records was the foresight of the management in disposing of the water power rights and installation of waste heat boilers, for with the low water in Muskegon river this year the company would have been seriously handicapped in maintaining a 50% production record, also the building of the new concrete silos as the company is now able to store a large amount of cement.

June also established another highly gratifying record as no accidents were reported during the month. All employees are still wearing their "No Accident" buttons as a reminder to repeat on June's record.

With all necessary preparations completed, actual construction work on the new $3,000,000 lake harbor for the Buffington plant of the Universal Portland Cement Co. was started in June. The new harbor is to be continued just west of the large cement plant. The harbor will be nearly a mile long and the largest of lake vessels will be able to navigate its water.

The Peerless Portland Cement Co. has started grinding cement at the new plant at Detroit, Mich. The first shipment of the finished product from the plant was scheduled for July 27.

A contract to design and construct three concrete packing houses and a concrete bag house for the Edison Portland Cement Co. as an addition to its plant at New Village, has been awarded to the Public Service Production Co.

The packing houses will have a capacity of 10,000 barrels of cement a day and the bag house, 240 ft. long and two stories high, will hold 2,000,000 bags.

The empty bags will be delivered by the railroad at the baghouse, where they will be cleaned and sewed on the ground floor, transported on electric trucks to an elevator and conveyed to the second floor.

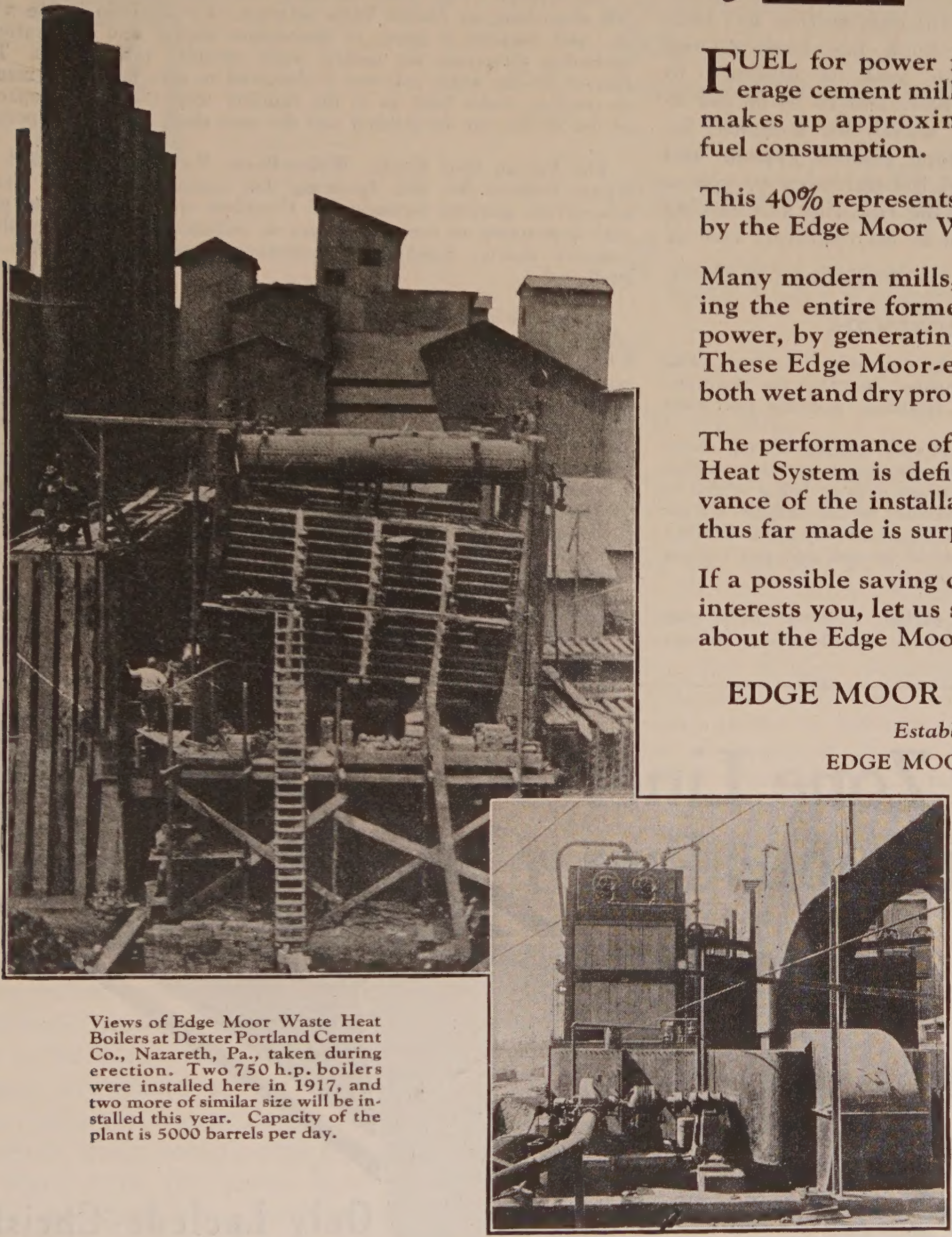
Thence the bags will be carried over bridges to the packing houses, where they will be loaded and made ready for shipment.

Chain Belt Co., Milwaukee, manufacturers of Rex chain, conveying equipment, and concrete mixers, announces the appointment of John M. Smallshow as salesman in the St. Louis territory to succeed T. F. Scannell. Mr. Smallshaw will handle the company's chain and engineering line and will make his headquarters at 1117 Boatmen's Bank Building, St. Louis, Missouri. The Tulley Equipment Co. will continue to be the exclusive distributors of Rex mixers for that district.

The Lehigh Portland Cement Co., having increased production at its Tarrant City plant, near Birmingham, Ala., from 1,500,000 barrels per annum to more than 1,800,000 barrels, is now engaged in doubling its storage capacity by adding to its silo units. The silos are being constructed of concrete with steel reinforcement. The cement industry in the Birmingham, Ala., district is reported as showing steady gains and prospects for this year are regarded as so bright that all plants are increasing their output and also adding to their storage capacity so as to be in position to handle an extraordinary trade when weather conditions are such that outside work can be done. The cement industry has come to the front with such a rush and the Birmingham, Ala., district plants are so active that it is considered impossible to estimate future activities.

A large number of engineers have recently taken a two weeks course in design and concrete mixtures and field control of concrete, offered by the Portland Cement Association through J. R. Rairman, district engineer, at Birmingham, Ala. Instructions were given in the standard methods of taking samples, making compression tests, and controlling the quality of cement in the field. Prof. Duff A. Abrams, of the Structural Materials Research Laboratories, gave several lectures on the work of the laboratories and on the properties of concrete aggregates.

40% of Fuel Cost Saved= *How much in your plant?*



Views of Edge Moor Waste Heat Boilers at Dexter Portland Cement Co., Nazareth, Pa., taken during erection. Two 750 h.p. boilers were installed here in 1917, and two more of similar size will be installed this year. Capacity of the plant is 5000 barrels per day.

FUEL for power requirements, in the average cement mill using direct-fired boilers, makes up approximately 40% of the total fuel consumption.

This 40% represents the saving made possible by the Edge Moor Waste Heat System.

Many modern mills, here and abroad, are saving the entire former cost of fuel burned for power, by generating steam from waste heat. These Edge Moor-equipped plants include both wet and dry process mills, large and small.

The performance of each Edge Moor Waste Heat System is definitely guaranteed in advance of the installation. Every installation thus far made is surpassing its guarantee.

If a possible saving of 40% of your fuel costs interests you, let us send you full information about the Edge Moor Waste Heat System.

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FOR INCREASED FUEL ECONOMY

New Books

Pit and Quarry Hand Book for 1925, by Harold W. Munday and associates; 456 pages; size 5½ in. x 9 in.; flexible binding; Complete Service Publishing Co., Chicago, Ill.

The 1925 Pitt and Quarry Hand Book is the third edition and is a more complete and available reference book than previous editions. Several new sections have been added, such as cost accounting, insurance, shipping data, and power plant. The useful data section has been enlarged and the rest of the book has been revised and brought up to date. The book is designed to serve its user quickly and effectively and to be an aid to the man who has little time to search for technical information in the sand, gravel, stone, cement, gypsum and lime industries. It is the aim of the publisher to give a complete reference book in both the editorial and catalog sections. The Hand Book is sent to all operators free of charge.

Trade Publications

Rock Dusting of Coal Mines by the Hardinge Co., York, Pa., issued as Bulletin No. 21 of that company, describes the Hardinge stationary pulverizing plant and the Hardinge portable pulverizer and duster.

It is pointed out in the bulletin that rock dusting of coal mines has now developed to the point where many mine operators realize its advantages and are dusting their mines without being forced to do so by legislation. The methods described in the bulletin are for use in cases where the dust is not purchased already ground. Illustrations show the general arrangements of one-car unit and two-car unit for combined pulverizer and duster.

An interesting book describing Link-Belt rivetless chain, well illustrated, has just been published by the Link-Belt Co., Chicago, Ill. The book portrays in a pleasing manner the assembly and disassembly of this simple chain, which has only three parts. The text matter is supported by tables of weights and strengths, and describes many of the uses to which this chain can be put.

The S. Flory Manufacturing Co., Bangor, Pa., has just published Catalog No. 39 devoted exclusively to Flory gasoline hoists. The list covers a complete line of standard sizes of hoists from 5 to 60 h. p., built in single, double or three-drum units, with or without swinging gears. Contained in the catalog, which is 6 x 9 in., 8 pages, are general specifications of Flory hoists.

The Graver Corp., East Chicago, Ind., has issued Bulletin No. 509 describing its Zeolite water softener. The bulletin is 8½ x 11 in., and contains 8 pages of descriptive matter and illustrations, including directions for taking water samples for analysis. The Graver Zeolite water softener is designed to give maximum results in treating water both as to the rapidity with which the capacity of the Zeolite can be utilized and the very short installation period.

The Vulcan Iron Works, Wilkes-Barre, Pa., has just issued an 8-page bulletin No. 102, featuring that company's 16- and 20-ton gear-driven gasoline locomotives. Complete specifications and general description of these two sizes is included as well as hauling capacity charts. Some very interesting photographs are also reproduced.

An interesting treatise upon comparatively small industrial power plants has just been issued by the CoKal Stoker Corporation, Chicago. This treatise, of 8 pages, is particularly well illustrated with charts and curves in two colors showing exactly how furnace operation varies with boiler output, the effect of stack temperatures upon economy and the influence of soot blowing upon stack temperature, together with other technical features of power plant operation. However, while dealing with technical subjects, the matter has been handled from the viewpoint of dollars and cents. It specifically tells how a fuel saving of 25% was made on test, a saving that has since been maintained at 20%. It has been written expressly for the chief engineer and executive concerned primarily with the operation of power plants.

Four major sections deal respectively with "How to Cut Your Steam Costs," "The Vital Importance of Uniform Steam Pressure," "Co-ordinating Efficiency and Output," "Keeping Down Stack Temperatures."

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